

Form 313(b)-5

**PETITION TO WITHDRAW APPLICATION FROM ISSUE AFTER ISSUE FEE PAID  
FOR ABANDONMENT TO PERMIT CONSIDERATION OF AN INFORMATION  
DISCLOSURE STATEMENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
Richard G. Henry  
Serial No.: 09/022,779  
Filed: February 12, 1998

Art Unit: 1721  
Examiner: L. Cross  
Batch No.: U96

**For: ZERO VOLATILE ORGANIC COMPOUND  
COMPOSITIONS BASED UPON ORGANIC SOLVENTS  
WHICH ARE NEGLIGIBLY REACTIVE WITH HYDROXYL  
RADICAL AND DO NOT CONTRIBUTE APPRECIABLY  
TO THE FORMATION OF GROUND BASED OZONE**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

PETITION TO WITHDRAW APPLICATION FROM ISSUE PURSUANT TO 37 C.F.R. 1.313(b)(5)

Dear Sir:

Applicant hereby petitions the Commissioner to withdraw the above-identified application from issue. The issue fee in this application was timely paid on (date).

The fee required by § 1.313(a) as set forth in § 1.17(i)(1) is appended hereto.

Applicant respectfully petitions that the above-identified application be withdrawn from issue and abandoned, in order to permit consideration of an information disclosure statement under 37 C.F.R. § 1.97 in a continuation application being simultaneously filed.

Accordingly, applicant respectfully requests that this petition be granted and the above-identified application withdrawn from issue and abandoned pursuant to 37 C.F.R. § 1.313(b)(5) in favor of the continuation application.

Respectfully submitted,

Date: *21 July 1999*

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(54) [Title of the Invention] Rubber-type adhesive composition

(57) [Summary]

[Objective]

To provide a rubber-type adhesive composition, that has a solvent system without using volatile, ignitable solvents or chlorinated solvents, the use of which is limited because of environmental pollution, worker safety issues, ozone layer damage, etc., while maintaining the adhesiveness.

[Composition]

A rubber-type adhesive composition in which a rubber component such as natural rubber, nitrile rubber, styrene/butadiene rubber, chloroprene rubber, butyl rubber, chloride rubber, chlorinated polyethylene, chlorosulfonated polyethylene, styrene-type block copolymer, polyurethane-type rubber, etc., and various additives are dissolved in a solvent system with n-propyl bromide and/or isopropyl bromide as major components.

[Parent Claims]

[Claim 1]

A rubber-type adhesive composition, characterized by the fact that it is a rubber-type adhesive composition containing a rubber component, additives and a solvent system, and that the solvent system contains n-propyl bromide and/or isopropyl bromide as major components.

[Claim 2]

The rubber-type adhesive composition described under Claim 1, characterized by the fact that the rubber component is a chloroprene rubber.

[Detailed Description of the Invention]

[0001]

[Field in Industry]

The present invention relates to a rubber-type adhesive composition containing a novel solvent system. More specifically, it relates to a rubber-type adhesive composition, that has a solvent system without using volatile, ignitable solvents or chlorinated solvents, the use of which is limited because of environmental pollution, worker safety issues, ozone layer damage, etc.

[0002]

[Prior Art]

Chloroprene rubber has a high tendency to crystallize and a high aggregation force and hence is generally used as a raw material for adhesives. For various applications of adhesives, chloroprene rubber and additives such as phenolic resin, zinc oxide, magnesium oxide, etc.,

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have been dissolved in volatile and ignitable organic solvents such as toluene, methyl ethyl ketone, etc.

[0003]

Subsequently, due to regulations on discharge of solvents into the atmosphere and on worker safety, the use of the solvents has been reduced, and consequently chlorinated solvents have been selected that have higher igniting points. For example, 1,1,1-trichloroethane and methylene chloride have been used as mixtures with hexane, methyl ethyl ketone and isopropyl alcohol.

[0004]

[Problems to be Solved by the Invention]

However, use of chlorinated solvents, like freons, has been quickly limited due to ozone damage problem.

[0005]

As a counter-measure, manufacturers have been focusing on latex grade using water as a solvent. Although gradually, commercialization of latex has been progressing.

[0006]

However, these solvent systems still do not have satisfactory properties. Accordingly, modification of solvents of solvent systems also has been on-going.

[0007]

Currently, there has been a trend in that methylene chloride is used instead of 1,1,1-trichloroethane as solvent of solvent systems due to its extremely low toxicity. However, essentially the ozone damage problem has not been solved.

[0008]

The present invention has been achieved aimed at solving the above problems. Thus, the objective is to provide a rubber-type adhesive composition that can solve the traditional environmental and toxicity problems and has sufficient properties.

[0009]

[Means of Solving the Problems]

The inventors carried out repeated, active studies against this background and consequently achieved the present invention. Thus, the present invention relates to a rubber-type adhesive composition in which a rubber component and various additives are dissolved in a solvent system with n-propyl bromide and/or isopropyl bromide as major components.

[0010]

In the following, the present invention is further described in detail.

[0011]

The present rubber-type adhesive composition contains a rubber component, additives and a solvent system. In particular, the solvent system contains n-propyl bromide and/or isopropyl bromide as major components.

[0012]

Thus, by using the solvent system containing n-propyl bromide and/or isopropyl bromide as major components, an adhesive can be provided that has sufficient adhesive properties and excellent safety.

[0013]

There are no special limitations to the blend ratios of n-propyl bromide and isopropyl bromide when they both are used.

[0014]

In the solvent system containing n-propyl bromide and/or isopropyl bromide as major components, traditionally used solvents also can be used as supplements as long as the solubility of the components is not adversely affected. There are no special limitations to types of the traditionally used solvents. They can be, for example, aromatic hydrocarbons such as toluene, xylene, etc., aliphatic hydrocarbons such as heptane, hexane, etc., ketones such as acetone, methyl ethyl ketone, etc., acetic esters such as ethyl acetate, propyl acetate,

etc., alcohols such as propyl alcohol, butyl alcohol, etc., chlorinated solvents such as 1,1,1-trichloroethane, methylene chloride, etc.

[0015]

There are no special limitations on the amounts of the traditionally used solvents as supplements. For example, less than 50 wt% is preferable from the standpoints of environmental protection and safety assurance.

[0016]

There are no special limitations on the type of rubber component in the present invention, as long as it can be dissolved in the solvent. For example, it can be natural rubber, nitrile rubber, styrene/butadiene rubber, chloroprene rubber, butyl rubber, chloride rubber, chlorinated polyethylene, chlorosulfonated polyethylene, styrene-type block copolymer, polyurethane-type rubber, etc. Among these, chloroprene rubber is preferable because of its excellent initial adhesive power.

[0017]

When chloroprene rubber (polymer) is used as the rubber component in the present invention, the monomer can be chloroprene alone or also includes, up to 50 wt% of the chloroprene, unsaturated carboxylic esters such as acrylic esters, methacrylic esters, etc., unsaturated carboxylic acids such as acrylic acid, methacrylic acid, itaconic acid, maleic acid, etc., vinyl-substituted aromatic compounds such as styrene, vinyltoluene, etc., conjugated dienes such as butadiene, 1-chlorobutadiene, 2,3-dichlorobutadiene, etc., polar-group-containing vinyl compounds such as acrylonitrile, methacrylonitrile, vinyl chloride, vinylidene chloride, etc.

[0018]

There are no special limitations on the method for producing the polymer. Generally the emulsification polymerization method is used. By standard procedures, water, monomers, emulsifying agent, dispersing agent, polymerization initiator, molecular-weight-adjusting agent, etc., are emulsified and polymerization is performed at a specific temperature. The resultant emulsification polymerization liquid, after removal of unreacted monomers and adjustment of pH, is subjected to, for example, freezing in rotating cooling drum, washing, then processed as film by mechanical press. Finally, by finishing treatment by a hot air drying in belt-type dryer, chloroprene rubber is obtained.

[0019]

When the rubber component is chloroprene rubber in the rubber-type adhesive composition obtained in the present invention, it can be used as the base material for normal solution-grafted polychloroprene adhesives, one-solution-type adhesives and two-solution-type

adhesives.

[0020]

Solution grafted polychloroprene adhesive is an adhesive with another polymer grafted on the side chains of the chloroprene rubber. For example, it can be obtained by a standard method by graft reaction with an acrylate such as methyl methacrylate in a chloroprene rubber solution.

[0021]

One solution type adhesive is an adhesive with rubber and various additives homogeneously mixed in the solution. For example, it can be obtained by using chloroprene rubber as base material and adding, by a standard method, various additives including zinc oxide, magnesium oxide, modified phenolic resin and the solvent system containing n-propyl bromide and/or isopropyl bromide by which the present invention is characterized.

[0022]

The two-solution-type adhesive is an adhesive that has been further reinforced by crosslinking between chloroprene rubber and polyisocyanate. For example, it can be obtained by mixing a chloroprene rubber solution and a polyisocyanate solution before coating the adhesive. The polyisocyanate used in the two-solution-type adhesive, consisting of a rubber solution containing the chloroprene rubber obtained in the present invention as base material and polyisocyanate, is any polyisocyanate with an average number of functional groups of at least 2, such as tolylene diisocyanate (abbreviated as TDI in the following), 4,4'-diphenylmethane diisocyanate, hexamethylene diisocyanate, 1,5-naphthylene diisocyanate, polymethylenepolyphenyl isocyanate, triphenylmethane triisocyanate, tris(4-phenyl isocyanate) thiophosphate, dimer of TDI, trimer of TDI, etc. There are no special limitations on the blend ratio. It can be 0.1-5 weight part of the active component of polyisocyanate per 100 weight part of the chloroprene rubber adhesive solution containing chloroprene rubber and/or other adhesive components.

[0023]

In the present rubber-type adhesive composition, in addition to the major component (the rubber component), various additives such as phenolic resin, rosin compounds, coumarone resin, metal oxides, antiaging agents, fillers, etc., can also be added.

[0024]

[Practical Examples]

In the following, the present invention is described in detail by the way of practical examples. However, the present invention is not limited to these practical examples.

[0025]

Adhesive tests performed in the practical examples were evaluated by the following methods.

[0026]

< Room temperature peel strength >

A SBR rubber plate (150 mm x 25 mm, from Showa Gomu Corp., Ltd.) was polished using a #60 abrasive cloth. On one side of it and on a #9 cotton canvas (150 mm x 25 mm), adhesive composition was coated with a brush at about 200 g/m<sup>2</sup>. After having been heated at 60°C for 10 min, they were pressed with a hand roller, then allowed to stand at a constant temperature of 23°C for 3 days, thereby obtaining a test sheet. The test sheet was tested for 180° peel strength in a tensile test machine at 23°C at a pulling speed of 200 mm/min.

[0027]

< High temperature peel strength >

The test sheet prepared as in the room temperature peel strength test was tested for 180° peel strength in a tensile test machine at 80°C at a pulling speed of 200 mm/min.

[0028]

Practical Example 1

A sheet obtained by kneading 100 weight parts of a chloroprene rubber (Skyprene (trademark) G-40S, from Toso Corp., Ltd.), 4 weight parts of magnesia and 5 weight parts of activated zinc oxide in a roll was cut and dissolved in 617 weight parts of n-propyl bromide. Besides, 50 weight parts of a thermoreactive alkylphenol resin (TD-773, from Dainihon Ink Corp., Ltd.) and 5 weight parts of magnesia were dissolved in 50 weight parts of n-propyl bromide. By mixing the two solutions, a one-solution adhesive composition was obtained. The mixture was examined visually but no phase separation was seen.

[0029]

The adhesion test revealed that the room temperature peel strength was 220 N/25 mm while the high temperature peel strength was 40 N/25 mm, having excellent adhesive performance.

[0030]

Practical Example 2

The same experiment as in Practical Example 1 was performed except that the solvent was changed to isopropyl bromide/hexane (90/10 by weight), to obtain an adhesive composition. No phase separation was seen in the composition.

[0031]

The adhesion test revealed that the room temperature peel strength was 210 N/25 mm

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while the high temperature peel strength was 40 N/25 mm, having excellent adhesive performance.



[0032]

## Practical Example 3

The same experiment as in Practical Example 1 was performed except that the chloroprene rubber and the solvent were changed to Skyprene (trademark) Y-30S, from Toso Corp., Ltd.) and n-propyl bromide/hexane (90/10 by weight), respectively, to obtain an adhesive composition. No phase separation was seen in the composition.

[0033]

The adhesion test revealed that the room temperature peel strength was 190 N/25 mm while the high temperature peel strength was 60 N/25 mm, having excellent adhesive performance.

[0034]

## Practical Example 4

One hundred weight parts of a nitrile rubber (Nipol(?) (trademark) 1072, from Nihon Zeon Corp., Ltd.) and 100 weight parts of a thermoreactive phenolic resin (PR12687, from Sumitomo Durez(?) Corp., Ltd.) were dissolved in 470 weight part of n-propyl bromide/methyl ethyl ketone (90/10 by weight), to obtain an adhesive composition.

[0035]

Adhesion test revealed that the room temperature peel strength was 120 N/25 mm while the high temperature peel strength was 30 N/25 mm, having excellent adhesive performance.

[0036]

## Practical Example 5

The same experiment as Practical Example 1 was performed except that the solvent was changed to n-propyl bromide/isopropyl bromide (50/50 by weight), to obtain an adhesive composition. No phase separation was recognized in the composition.

[0037]

The adhesion test revealed that the room temperature peel strength was 200 N/25 mm while the high temperature peel strength was 50 N/25 mm, showing excellent adhesive performance.

[0038]

## Practical Example 6

One hundred weight parts of a chloroprene rubber (Skyprene (trademark) G-40S-1, from Toso Corp., Ltd.) was dissolved in 567 weight part of n-propyl bromide. Immediately before the adhesion test, 20 weight parts of an isocyanate compound (Desmodur(?) (trademark) RFB, from Bayer) was mixed homogeneously to obtain a two-solution adhesive composition, followed by the adhesion test.

[0039]

The adhesion test revealed that the room temperature peel strength was 250 N/25 mm while the high temperature peel strength was 50 N/25 mm, showing excellent adhesive performance.

[0040]

[Effects of the Invention]

Because in the present rubber-type adhesive composition the solvent system has n-propyl bromide and/or isopropyl bromide as major components, volatile, ignitable solvents or chlorinated solvents, the use of which is limited because of environmental pollution, worker safety issues, ozone layer damage, etc., are not required, while sufficient adhesion performance is still maintained.

[0041]

Thus, the present rubber-type adhesive composition is suitable for various applications for wood, fabric, rubber, plastic, metal, etc.